

**COMPOSITE ORGANIC-INORGANIC NANOPARTICLES AND METHODS FOR  
USE THEREOF**

**ABSTRACT OF THE INVENTION**

Composite organic-inorganic nanoparticles (COIN) are provided that produce surface-enhanced Raman signals when excited by a laser. The nanoparticles include metallic colloids and a Raman-active organic compound. The metal required for achieving a suitable SERS signal is inherent in the nanoparticle, and a wide variety of Raman-active organic compounds can be incorporated into the particle. Indeed, a large number of unique Raman signatures can be created by employing nanoparticles containing Raman-active organic compounds of different structures, mixtures, and ratios. Thus, nanoparticles and methods described herein are useful for the simultaneous detection of many analytes in a mixture, resulting in rapid qualitative analysis of a mixture. In addition, since many Raman-active organic compounds can be incorporated into a single nanoparticle, the SERS signal from a single COIN particle is strong relative to SERS signals obtained from Raman-active materials that do not contain the nanoparticles described herein.